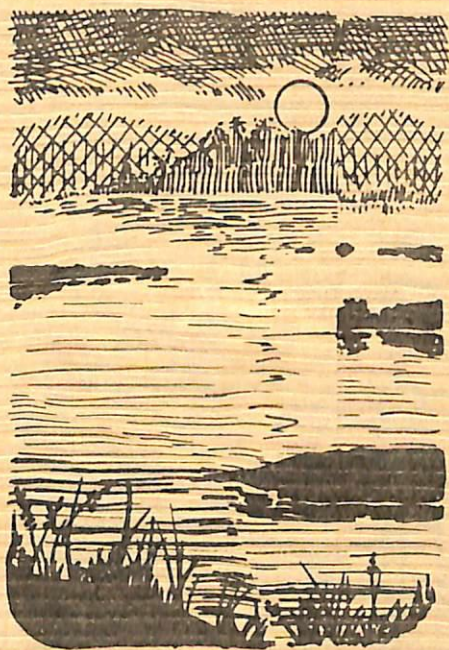


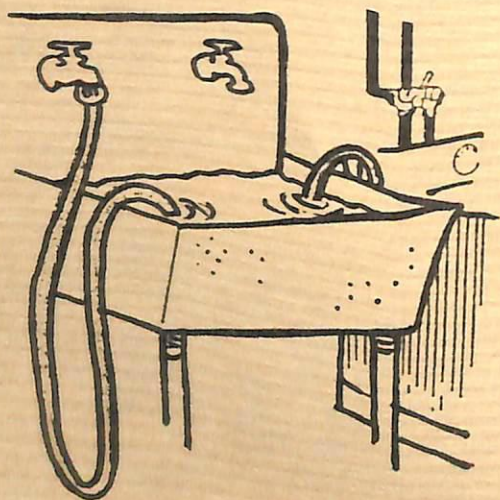
**Cross Connection
Questions
&
Answers
Are You
Particular
About What
You Drink?**



KDHE 1987

What is a "cross connection"?

A cross connection is any arrangement of pipes, hoses, or other means by which the potable water system can be connected to and contaminated by a non-potable water source. Contamination can occur by backsiphonage or backpressure backflow. Backsiphonage is the reversal of normal flow in the potable system due to a vacuum or reduced pressure in the supply system. Backsiphonage can occur because of a high demand on the supply system, such as fire fighting or a main break. In marginal pressure areas, simply flushing a downstairs or basement stool can cause a negative pressure in the upstairs system or upper stories of a building, potentially allowing contaminants to be drawn into the plumbing system. Backpressure backflow occurs whenever the downstream pressure exceeds the supply pressure. Examples include hot water boiler systems and improperly connected high pressure pumps.



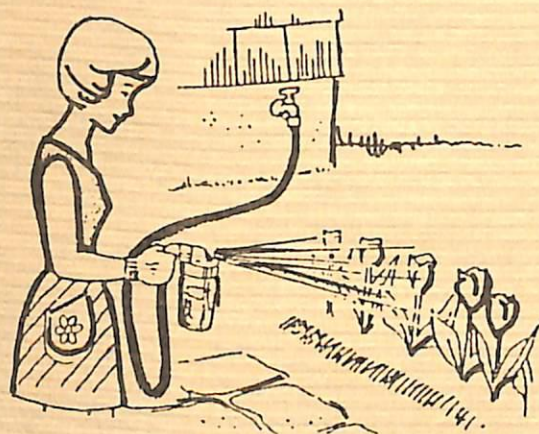
What is the most common cross connection?

The everyday garden hose is the most common cross connection. Its portability and ease of connection to the potable system and potentially dangerous situations require special attention and public education emphasis. **Hoses are left submerged in swimming pools, stock watering tanks, and assorted wastewater tanks. They are left laying on the ground, which may be contaminated with fertilizers, pesticides, stock wastes, and surfacing septic tank effluent. In the home, hoses are left submerged in sinks and bathtubs, but probably the most dangerous household threat is the application of herbicides and insecticides with an aspirator-type applicator from an unprotected hose bibb or hydrant. The protection afforded by a properly installed and functioning hose bib vacuum breaker is often breached by keeping the discharge end of the hose above the elevation of hose bib connection.** False security is often worse than no security. For example, a hose bib vacuum breaker provides no protection if the discharge end of the hose is submerged in a herbicide tank three feet (or any distance) about the hydrant. On a larger scale, careless filling of commercial fertilizer and pesticide vehicles at unprotected bulk loading stations or fire hydrants presents a very real danger to public drinking supplies.

As a water supplier, what are my responsibilities regarding "cross connections"?

Kansas statutes require that **potable water supplies** be protected from contamination. Kansas regulations require all public water systems to have a regular program approved by the **Department of Health and Environ-**

ment for the detection and elimination of cross connections and prevention of backsiphonage and backpressure backflow. Water purveyors must take appropriate and necessary action to ensure the potable water system is protected from contamination; these actions include requiring the installation of backflow prevention devices consistent with the degree of hazard or, if ultimately necessary, discontinuance of service.



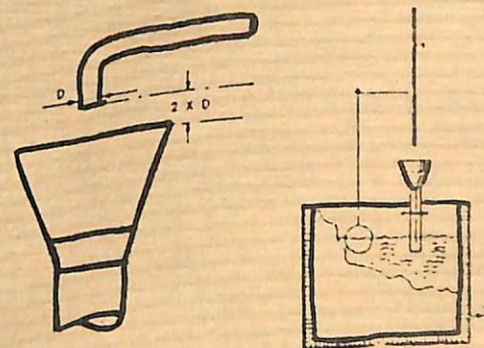
What are some examples of documented cross connection cases?

Because no one was harmed, some cases sound amusing. For example, gold fish from a garden fish pond were backsiphoned through a submerged garden hose into a home's bathtub when a negative pressure was caused by opening the bathtub faucet. Or consider the time the pressure caused by the fermentation process caused sparkling Burgundy to be forced into a city's water mains. Contrast these "amusing" occurrences to the case of several nurses in a hospital who complained of "red water" at the drinking fountain outside of the hospital morgue. Or consider the case of the **home**

gardener who was using an aspirator-type sprayer to apply a herbicide containing arsenic. The gentleman disconnected the sprayer to get a drink of water from the hose, not knowing a pressure reduction had caused the arsenic to be drawn back into the hose. He died.

What is meant by "degree of hazard"?

Degree of hazard is a term used to describe the seriousness of a potential cross connection by determining whether substances in the non-potable water supply are toxic or non-toxic. For the purposes of cross connection control, a **toxic substance is any liquid, solid, or gas which, when introduced into the public water system, may create a danger to the health of the consumer.** Examples are pesticides and treated boiler water. A **non-toxic substance is any liquid, solid, or gas which, when introduced into the potable water system, may create a moderate hazard to consumer health, may be a nuisance, or may be aesthetically objectionable.** Examples are foodstuffs, such as sugar, milk and soda pop.





What are the 5 basic devices for cross connection protection?

The five basic devices are:

1. Air gap.
2. Atmospheric vacuum breaker.
3. Pressure vacuum breaker.
4. Double check valve assembly.
5. Reduced pressure principle backflow preventers.

The surest protection for all degrees of hazard is a properly designed physical separation of the potable and non-potable water systems by an air gap. Generally, properly located and installed atmospheric vacuum breakers, pressure vacuum breakers, and double check valve assemblies provide protection from non-toxic substances. Toxic substances require reduced pressure principle backflow preventers as a minimum.

What is a cross connection control program?

A cross connection control program is most effectively established through a cooperative

effort of the water supplier, plumbing and health officials, property owners and certified testers. The program establishes requirements for controlling cross connections and implementing an enforcement policy to assure the potable water supply will be protected both in the distribution system and within connected structures. Public education is a significant element of a program which establishes the type of protection required for various situations and which establishes the responsibility for administration and enforcement.

Is periodic testing and maintenance required for backflow prevention devices?

Yes. The cross connection control program must provide for routine assessments of the devices to assure they are functioning properly and providing the protection required. Failure to do so exposes the water supplier to potential liabilities comparable to taking no action to protect the water supply. Certified testers should conduct the tests.

Where do I begin?

The place to start is to assure that you have an adequate cross connection control program. If you do not have an approved program, you may wish to contact KDHE for assistance. If your program is approved, you should begin by checking the most serious to least serious potential cross connection sources. Your list may include:

- Hospitals.
- Bulk loading stations.
- Funeral homes.
- Pesticide applicators.
- Schools and nursing homes.
- Industries.
- Restaurants and other commercial establishments.

Where is more information and training on cross connection control available?

Contact any of the following **Kansas Environmental Training System** participants for scheduled events:

Jim Current **Kansas Department of Health & Environment**

Division of Environment
Forbes Field, Bldg. 740
Topeka, KS 66620-0001

Tim Hobson or Monte Piersee
Salina Area Vo-Tech School
2562 Scanlan Avenue
Salina, KS 67401
(913) 825-2261

Larry Nelson or Pat Flynn
Fort Scott Community College
2108 South Horton
Fort Scott, KS 66701
(316) 223-2700

Harold E. Marconnette
Dodge City Community College
2501 North 14th Avenue
Dodge City, KS 67801
Toll-free: 1-800-742-9519

Elmer Ronnebaum
Kansas Rural Water Association
Box 226
Seneca, KS 66538
(913) 336-3760



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2501 N. 14th Ave., Dodge City, KS 67801